

Top of The Bench

Preliminary Round 2020, Year 9 Students only.

RSC Birmingham & West Midlands Local Section.

Time 35 Minutes. All answers must be written on the separate Answer sheet.

	Question
1	What are the names of these compounds [a] MgO, [b] CaCO ₃ , [c] H ₂ SO ₄ , [d] CO, [e] H ₂ CO ₃ .
2	What do you make when a solute is dissolved in a solvent ?
3	What are the colours of [a] copper(II) oxide, [b] calcium carbonate, [c] copper sulfate crystals, [d] neutral litmus paper, and [e] liquid bromine?
4	"A?.... consists of two or more elements or compounds that can be separated by physical methods". What is this a definition of?
5	Calculate the relative molecular mass, Mr, for [a] NiO, [b] NH ₄ NO ₃ , [c] Ca(OH) ₂ , and [d] MgSO ₄ .7H ₂ O.
6	Write the chemical formula for each of [a] sodium hydroxide, [b] magnesium carbonate, [c] iron(II) sulfate, and [d] aluminium oxide.
7	Complete these word equations: [a] hydrogen + oxygen →, [b] sodium + water → +, [c] magnesium carbonate → magnesium oxide +
8	What are the whole numbers [x, y, a, b, c, w, z] needed to balance the equations? [a] x KOH + H ₂ SO ₄ → K ₂ SO ₄ + y H ₂ O ; [b] a Al + b Cl ₂ → c AlCl ₃ ; [c] P ₄ + w O ₂ → z P ₂ O ₅
9	Using 'ox' for oxidation and 'red' for reduction identify these reactions as 'ox' or 'red': [a] oil burning. [b] iron rusting, [c] making iron from iron oxide, [d] a firework exploding.
10	Which word[s] completes the sentence? 'The atomic number of an atom of an element is equal to the total number of its.....' [a] electrons, [b] neutrons, [c] protons, [d] the sum of [a] + [b].
11	Name the salts resulting from [a] potassium hydroxide + hydrochloric acid, [b] zinc oxide + sulfuric acid, [c] PbO + HNO ₃ , [d] Limescale CaCO ₃ + citric acid.
12	Which gas could be detected with [a] limewater, [b] a glowing wooden splint, [c] damp blue litmus paper?
13	Choose from the pH numbers 1, 6, 7, 9, 13 the appropriate one for [a] a weak alkali, [d] a strong acid, [c] a strong alkali, [d] pure water, [e] lemon juice.
14	Which of these oxides will form an alkaline solution when dissolved in water: [a] CaO, [b] NiO, [c] CO ₂ , [d] Na ₂ O, [e] NO ₂ ?
15	'Sublimation' is the name for which change of state ? [a] solid→liquid, [b] liquid→gas, [c] solid→gas, [d] liquid→solid, or [e] gas→liquid.
16	What method would you use to separate a mixture of [a] food colours, [b] solid salt from salt solution, [c] the substances in crude oil, [d] oil and water, [e] iron powder and copper powder?
17	Name the type of bonding in [a] gold, [b] diamond, [c] potassium chloride, [d] a Cl ₂ molecule.
18	Put these elements Fe, Al, Cu, Na, Ag, K, Zn in the order from most reactive to least reactive.
19	Name [a] the most abundant noble gas in the Earth's atmosphere, [b] a radioactive alkaline earth metal, [c] a halogen extracted from seaweed, [d] a non-metal stored under water.
20	Use the equation; Ca + 2 H ₂ O → Ca(OH) ₂ + H ₂ , to calculate the mass of hydrogen H ₂ formed when 6g of calcium reacts with water.
21	[a] How many elements have symbols starting with P, and [b] which of these was discovered by Marie Curie?